University of Pune
Ph.D. Course work in School of Basic Medical Sciences

Course work: Three courses
1. Each course will be of 5 credits and equally assessed.
2. A course 103 will be handled by concerned guide
3. Director will keep the record for awarding Grade points and issuing of the certificate.

Ph.D SBMS 101: Research Methodology (5 Credits)
Mode of study includes: Assigning the topic to students based on their basic background and presentation in the form seminar which will be followed by discussion and submission of the write-up. This will be evaluated by group of teachers. There will not be any formal classroom teaching.

*Identification of a Research Topic and Problems*
*Reference collection from SCOPUS and various internet sources*
*Hypothesis and Research Design*
*Art of writing Thesis and a Research Paper*
*Introduction to Biostatistics*: Biostatistics and Biometry, Aims of Biostatistics, Applications of Biostatistics, Role of Biostatistics in Modern Research
Classification of data and Frequency distribution,
*Representation of Biometric Data*: Presentation of Data, Graphic Representation of Data, Histogram, Pictogram ,
*Central Tendency*: Mean, Median and Mode.
*Analysis of variance (Anova)*
*Test of Hypothesis and Test of significance*
*Introduction to Analyzing software*
Introduction to *Origin* Software,
Introduction to *ImajeJ* Software.
*Connecting Laboratory Instruments to computers*: Types of Interface, Analog Interface, and Digital I/O Interface
Ph.D SBMS 102: Biomedical Techniques (5 Credits)

Microscopy: Optical microscopy—Theory of microscopy, geometrical and physical optics, lenses and aberrations, focal length. Resolution, magnification, numerical aperture, objectives, eyepieces, condenser

Principle, optics and application of the following: Dark-field microscopy, Phase contrast microscopy, Interference microscopy, Polarizing microscopy, Fluorescence and confocal microscopy

Electron Microscopy: Introduction to electron microscopy. A comparison with optical microscopy(SEM,TEM)


Biomedical Recorders: Bioelectric Potentials, ECG, EEG, EMG, Electrocardiography, Block diagram of electrocardiograph; The ECG leads, effects of artifacts on ECG recording, Electroencephalography; Block diagram of EEG, Electrode locations, The normal EEG, clinical value of the EEG, Electromyography; Block diagram of EMG


Radiation Biology: Types of Ionizing and Non-Ionizing radiation(Gamma,uv,X-ray, Microwaves) Effects of Ionizing and Non-Ionizing radiation, Radioactivity, Radioisotopes and their Biomedical applications, Dosimetry,

Centrifugation and Gas Chromatography: Definition and basics, Gas Chromatography, Liquid Chromatography, TLC, HPLC, PAGE, Electrophoresis techniques

Ph.D SBMS 103: Special Course (5 Credits)
This will be monitored by the respective guide and students can obtain credits as follows.
Two Posters/papers presentation in National conferences: 1 credit
One Posters/papers presentation in International conferences: 1 credit
Attending workshop which is of minimum 10 days duration: 1 credit
Training in the laboratory outside the department at least of 15 days: 1 credit
Members of the organizing committee of any in National/International conferences: 1 credit
Recommended Books

2. Essentials of Biophysics by Narayanan, New age publications.
4. Medical Physics by John R. Cameron, J.G. Skofronick, John Willey and Sons, International Publications
5. Fundamentals of Biostatistics by Veer Bala Rastogi, Ane’s Student Edition